cycles

—A MONTHLY REPORT

September 1952

FOUNDATION FOR THE STUDY OF CYCLES
New York, New York

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cycles
—a monthly report

The Official Bulletin of the Foundation for the Study of Cycles

VOLUME III NUMBER 7 SEPTEMBER 1952

The Director's Letter

Dear Member:

With this issue we are resuming the series of articles in regard to cycles in the stock market which we started about a year ago. We interrupted this series in February and March of this year to tell you about the amazing forecast of pig iron prices made in 1874 by Samuel Benner—a forecast which came true for a period of over 60 years with a gain-loss ratio of 31 to 1. We continued the interruption in April, May, and June to give you the benefit of several multiple harmonic analyses of common stock prices and pig iron prices made possible through the generosity of Stockham Valves & Fittings, Inc. and of the Mico Instrument Company.

I realize that the harmonic analyses were very dull and of use only to cycle analysts. However, to such people, properly interpreted, multiple harmonic analyses are of great use. Consequently, we felt it necessary to publish them even at the expense of more interesting material. Now, however, the periodograms are behind us and we can devote our time to the various stock market cycles one by one; to cycles in general business; to cycles in the prices of various commodities such as pig iron, cotton, copper; and to other cycles such as cycles in real estate, construction, etc. that are of more general interest. Of course, we must also continue studies of cycles in natural science as well, so that we may learn ultimately whether or not the cycles in economic affairs have a natural science cause.

NEW DEPARTMENT

You may have noticed a new department called ‘How has it worked out?” which we inaugurated in the last (June) report. This department will be continued from time to time (for example, see page 242 of this issue) to show you the extent to which actual events have conformed to the cycles projected in earlier work.

FREE JOURNALS

There is so much valuable material in the Journal of Cycle Research that, starting this autumn, we plan to send the Journal free to all of our members. To save expense we plan to print the Journals as supplements to our monthly reports. In this way you will get the benefit of the material that goes into the Journal without any extra cost.

We will also continue the Journal as a separate publication for the benefit of those who wish to subscribe merely to the Journal and for free distribution to libraries and scientists who have contributed to the fund of knowledge in respect to cycles, rhythms, and/or periodicities.

FUNDAMENTAL HYPOTHESIS

The activities of the Foundation have meaning only in the light of a fundamental hypothesis. This hypothesis is that the cycles found in any field of science may also be found in another field. That is, that the cycles in solar phenomena may have their counterpart in climate, that climatic cycles may prove to be identical with cycles of animal abundance; that cycles in business, war, and other human activity may also correspond to cycles in any or all of these other phenonena.

There is a great deal of evidence in favor of this hypothesis, as I have mentioned from time to time and will set out for you in full in an article in a future report, but the hypothesis is, as yet, by no means proved.

If there is identity of wave length—as there seems to be—between certain cycles here on earth and certain cycles on the sun, it would seem reasonable to suppose either that the sun is in some way the cause of the earthly cycles, or that rhythmic energy from space affects both the sun and ourselves.

In either event it is not unreasonable to imagine that there may be some law or laws of relating one cycle length to another. It is therefore with especial interest that we publish in this issue some observations in this direction by Mr. William N. Drew of California, under the title "Order out of Chaos?" I imagine that Mr. Drew would be the last person in the world to assert that he has the final answer, but it is interesting and perhaps significant that he has been able to go as far as he has in systematizing the knowledge already gained.

The multiple harmonic analyses published in the April, May, and June issues provide additional material for work of this sort.

The Universal Solvent

The search for some grand unifying principle relating all cycle lengths to each other reminds me a little of the search, popular in the last century, for the universal solvent.

As you know, water dissolves many things, but leaves iron, for example, unaffected. Nitric acid will dissolve iron, but will not dissolve gold. Aqua regia dissolves gold, but has no effect upon glass. Hydrofluoric acid will dissolve glass, but will not dissolve wax, and so on.

The story goes that some young chemists were at work in a little shack out in the country trying to discover something that would dissolve **anything**. A farmer passing by said, "What you fellows doing?" When the nature of their activities had been explained the farmer thought for a while. Then he drawled, "W-a-l-l, when you got it made, what you going to keep it in?"

I do not think we would have any trouble "keeping" a universal law of cycles, if we ever found one. But I do think we need a great many more facts before we spend too much time trying to advance theories.

As I have mentioned before in these pages, the great British physicist, Tyndall, once said, "An idea in an empty head has the time of its life, for it can rotate in any orbit it chooses without having any facts to bump into!"

Perhaps someday, with enough facts to work with, some genius will be able to come up with some great unifying law. My own hopes, however, are much more modest. If, out of the welter of observable cycles, we can ultimately come up with a mere handful that are "real" and can be relied upon as firmly as we rely upon the cycle of the day and the cycle of the year; if, out of the scores of seeming identities of cycles we can come up with a half dozen that are really interrelated and which reveal cause and effect interrelationships hitherto unsuspected, I shall feel that the Foundation for the Study of Cycles has had more than its share of success in unraveling the mystery of the universe.

Very cordially yours,

Edward R. Dewey
Director

P.S. A **most** interesting article on the 46-month cycle in common stock prices has just come in. I plan to use it as the basis for the lead article in October. It has a definite bearing on the probabilities of stock market behavior for next year.

Research

THE THREE-YEAR CYCLE

IN INDUSTRIAL COMMON STOCK PRICES

by Alexander Malinowski
Staff Member, Foundation for the Study of Cycles

Summary

A cycle just a shade less than three years in length has characterized common stock prices, 1871 to date. When the figures have been adjusted to eliminate the 41-month waves this cycle is seen to be rhythmic and reasonably regular. It is in downward phase at the present time and will be until March of 1953.

FOR as far back as figures are available (1871) there has been a cycle in industrial common stock prices very close to three years in length.

Back in 1940, 12 years ago, Mr. Dewey recorded a cycle of this length in common stock prices, but until the past month the work has not been done to try to determine more exactly its average length, timing, shape, and amplitude.

You can see for yourself numerous hints of this cycle from 1871 to date by inspection of any series of industrial stock prices (see, for example, the deviations from trend of industrial common stock prices, 1871—1950, as published on pages 148 and 149 of our report for April 1951). However, the three-year waves are obscured by the concurrent presence of the 41-month cycle about which so much has been written, and by other cycles.

Cycle Seen More Clearly if 41-Month Cycle Removed

To get rid of the 41-month cycle we computed a 27-quarter (81-month) moving difference of the quarterly deviations from a nine-quarter (27-month) moving average of the Standard and Poor's Corporation Industrial Stock Price Index, 1871—1951, adjusted for trend. These moving differences and their five-quarter (15-month) moving average are shown by Curves A and B in Fig. 1 on the two pages next following. (See also pages 249-50.)

To the lower curve of Fig. 1 I have added a zigzag just a shade less than three years in length (35.4 months) so that you can see the extent to which the behavior corresponds to an ideal pattern. The length of 35.4 months or 2.95 years is the closest estimate of the true average length of this cycle that we have been able to make, up to the present time.

If 35.4 months is the true length of the cycle, the ideal cycle is in downward phase at the present time. It is due to reach its ideal trough in March of 1953. The average overall amplitude of the cycle is about 8% of trend.

For the general reader it is enough to say that the lower curve in Fig. 1 represents stock market behavior relative to (27 quarters) 81 months previous. When the zigzag curve projected into the future is above the axis it indicates that if this cycle continues there will be strength in the deviations, relative to 81 months before. When it is below the axis it indicates weakness relative to 81 months before.

What We Learn From Fig. 1

The important thing to learn from Fig. 1 is (a) that there has been a tendency for stocks to act as if they were influenced by a force which was just a shade less than three years from crest to crest and from trough to trough, (b) that this behavior has accounted for moves of considerable importance, and (c) that there has been a tendency for these moves to be rhythmic. The average length of the cycle seems to be 35.4 months. The wave in the moving percentages is symmetrical, as indicated by the diagram.

How the Cycle Unfolded

It may be in point to trace for you this cycle as it has unfolded from 1879 to date. (We have to start in 1879 because we are dealing with a series of comparisons, each point on the original curve being compared with the value 27 quarters (81 months) previous.)

For convenience of reference I have lettered the crests of the ideal 35.4-month cycle **A**, **B**, **C**, **D**, etc. and the troughs **a**, **b**, **c**, **d**, etc.

Starting on time with a low at **a** we find the leg **B-b** somewhat delayed. But crest **C** is nearly on time and trough **c**, in 1885, is back on schedule.

From this point forward to 1950 the conformity to the ideal pattern is quite good except in a few instances. The leg **G-g** is somewhat advanced; a distortion between '02 and '03 delays the leg **i-J**; another distortion in '13—'14 upsets the cycle but by '16 or '17 it has reasserted itself; another distortion in 1941 advances the leg **W-w**; but other than this the timing is about as regular as these things usually go and there is definite evidence of repetition with a beat—low, low, low, low, for example, across the page with a great deal of definiteness.

The use of moving percentages is twofold: first, to give us the length of this cycle much more accurately than we could get it from the original figures and, second, to demonstrate that the cycle really does repeat with a rhythm. It is

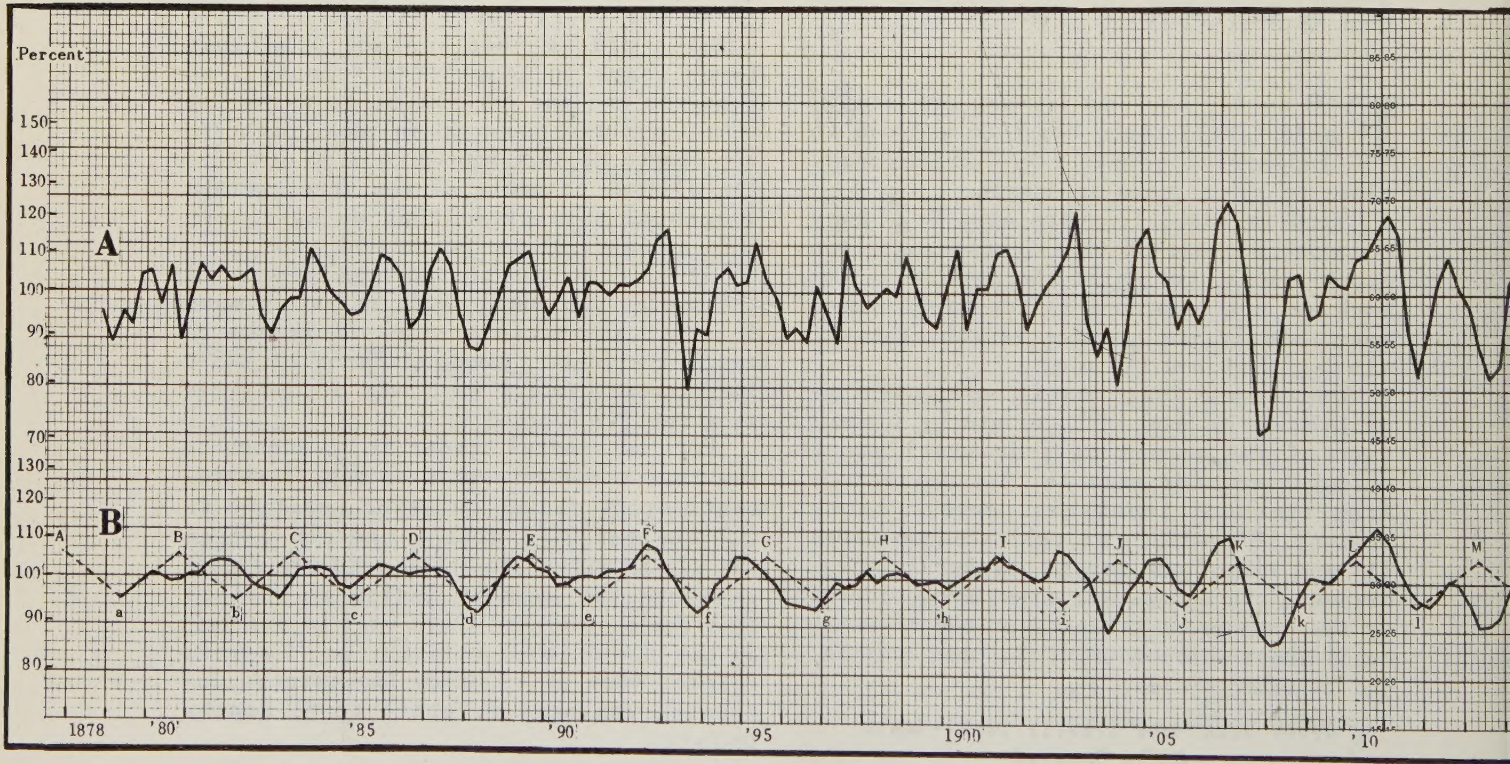


Fig. 1. Industrial Common Stock Prices, 1871—1950.

Upper curve: 27-quarter (81-month) moving difference of the deviations of the index (expressed as deviations from trend) from its 9-quarter moving average.

Lower curve: The same as the upper curve except that the values have been smoothed hard to be certain of either of these two facts when one looks at the unmanipulated figures.

The Cycle in the Actual Figures

Having assured ourselves of these two facts we can go back to the original figures to determine the amplitude, shape, and timing of the average wave. When we do this we find that the average wave is asymmetrical, going up for about two years and down for about one year as illustrated in Fig. 2 below. Fig. 2 shows the value of each position of an average cycle 11.8 quarters (35.4-months) long, repeated in phantom.

This cycle in these figures has repeated over a sufficient number of times and with a sufficient degree of regularity to indicate that it should be taken into account in attempting to forecast the future probabilities of the market.

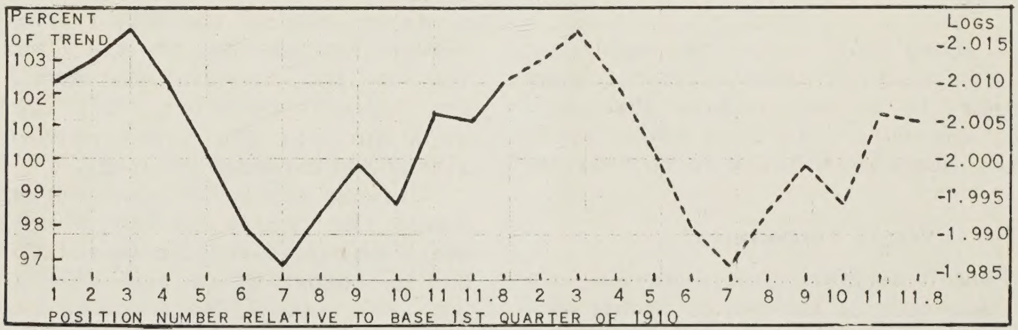
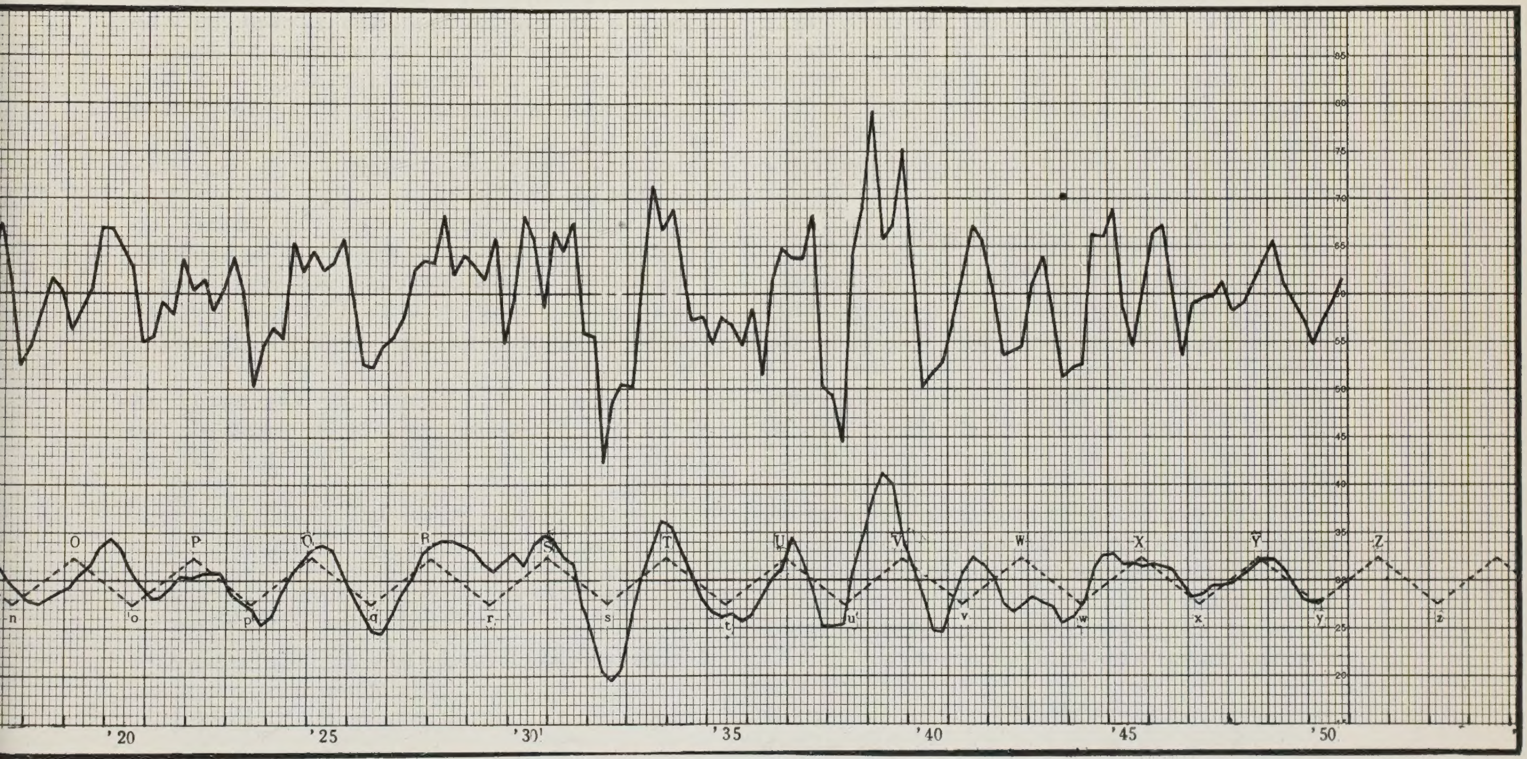


Fig. 2. Average 11.8-quarter (35.4-month) cycle in the actual deviations of the data adjusted for trend.



by a 5-quarter (15-month) moving average. An ideal 35.4-month cycle, shown by means of a broken zigzag line, has been added to help you to see the 3-year waves. It has been projected into the future to show in a general sort of way what will happen if this behavior continues. (For explanation of moving differences see pages 249-50.)

ORDER OUT OF CHAOS?

Summary

William N. Drew of California has developed a simple mathematical law which gives calculated values rather close to the observed values of cycles in the stock market. This fact suggests that there may be some underlying principles governing cycle length.

ARE there some basic laws governing the relation of cycle lengths to each other? It is human to hope that there may be, and to try to find them. There have been numerous efforts in this direction.

Triple Progression?

Hallbert P. Gillette, for example, observes that most of the cycles he has discovered in the alternate thickness and thinness of rock strata seem to fall into one or another of several triple progressions. In a triple progression each cycle has a wave length three times as long as some shorter cycle. Thus cycles of 2 years, 6 years (3 x 2 years), 18 years (3 x 6 years), 54 years (3 x 18 years), 162 years (3 x 54 years), and so on, would constitute a triple progression.

Harmonic Relationship?

Other people feel that lengths "ought" to fall into harmonic relationship. That is, if you have a cycle of 60 years, for example, you "ought" to have one of 30 years (1/2 of 60 years), one of 20 years (1/3 of 60 years), one of 15 years (1/4 of 60 years), one of 12 years (1/5 of 60 years), and so on.

There are many dramatic instances of apparent conformity to each of the above laws. Either or both concepts may have foundation in fact. But on the whole, I think it can safely be said that neither concept is entirely satisfactory.

Drews Law?

A third suggestion for a law which might govern the interrelationship of wave lengths comes from William N. Drew of Chula Vista, California. In a letter dated February 19, 1952 he writes:

Dear Mr. Dewey:

A few months ago you outlined an interesting set of data on stock market cycles as developed by you and "Predix." The remarkable agreements and the extensive range made me wonder if there could not be —or rather that there must be—some relationship between all these cycles.

After studying the data I arrived at an answer that provided the tie I was searching for, but, reaching for more I went to the index in December 1951 "Cycles" and took out all the stock market cycles listed and expanded my study.

By some graphical skullduggery I induced the cycles to lie along a curve which expressed a definite relationship. I had no theory as to what this should be but took it as I found it. At any rate it came out as a series with an integral term for each length of cycle.

Not to bore you with a lot of calculations I am enclosing only a copy of the raw data (stated in years for the length of the cycle) and my analysis.

You will note that the data are in two obvious groups: Series A and Series B. This distinction showed up during the graphical analysis in the form of two parallel lines sufficiently distinct to warrant separate treatment. I attribute this to varying techniques of cycle determination and possibly to the use of different chronological sections of the original data.

Where L is the length of the cycle in years and N is the particular term of the series the approximate relationships are as follows:

—for Series A, $L \quad N^2/49$
—for Series B, $L \quad N^2/53$

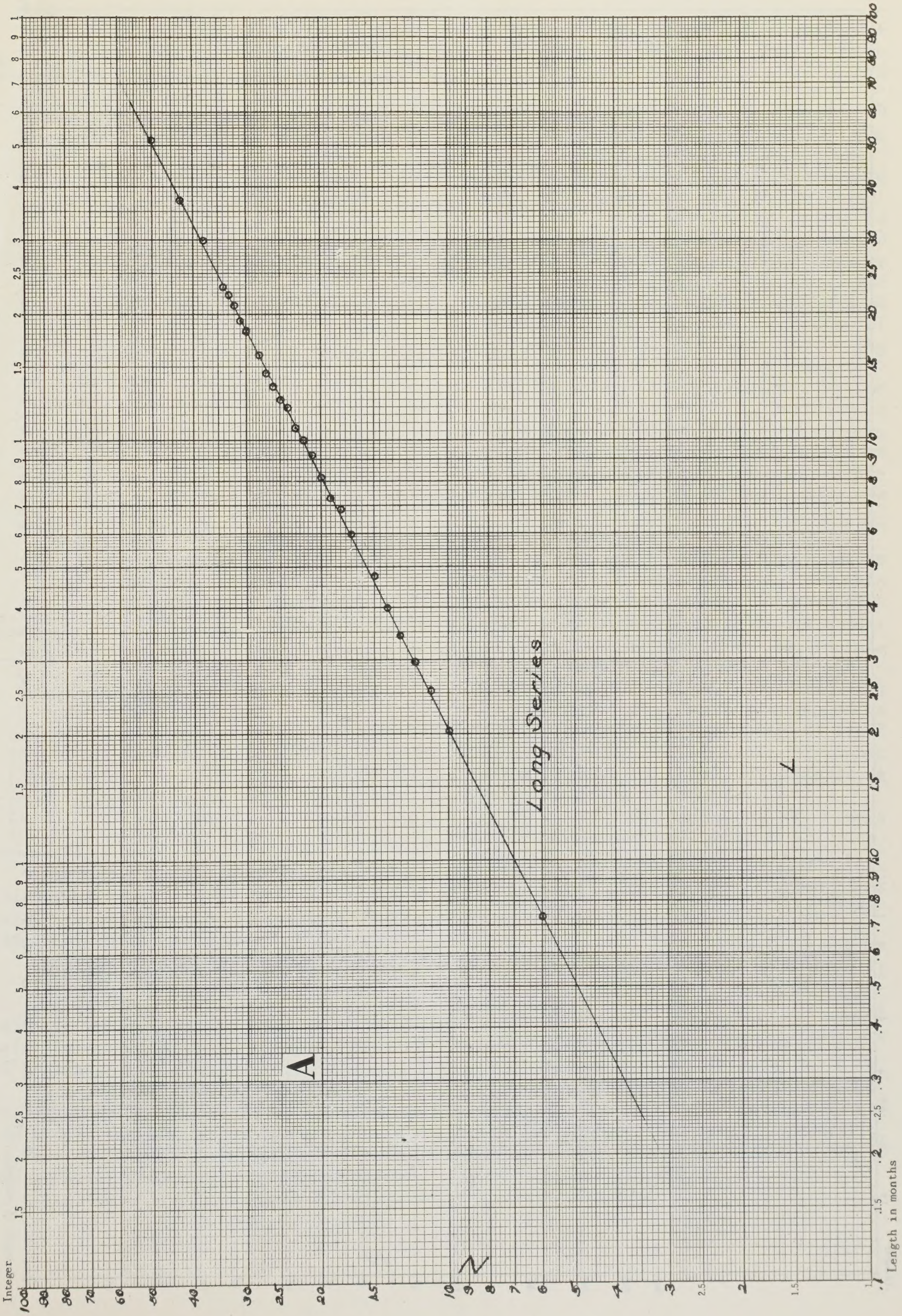
or, more exactly,

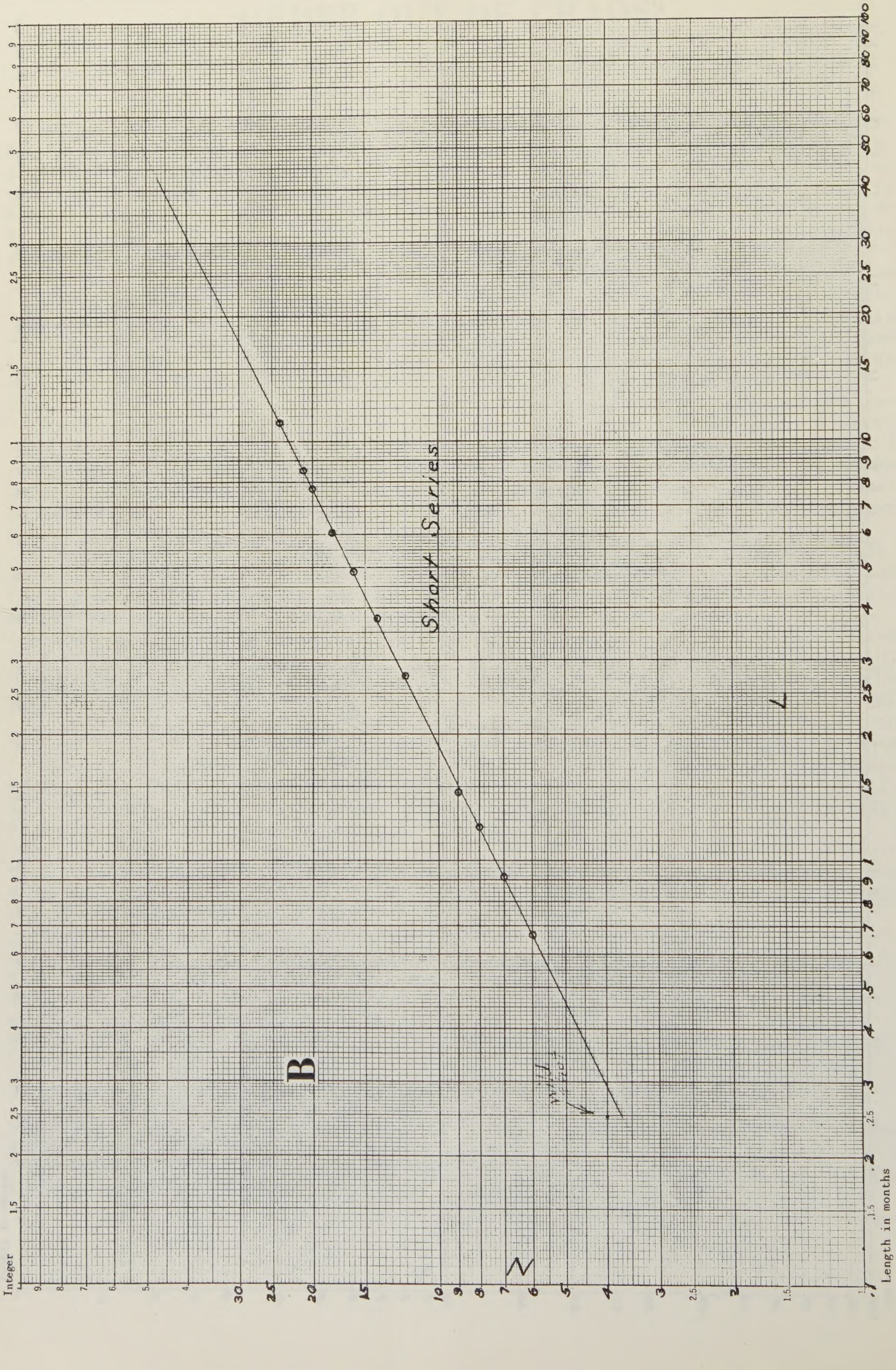
$$L \quad \frac{N^{1.9975}}{48.694} \quad \text{and} \quad L \quad \frac{N^{2.0143}}{54.866}$$

I hope you will find this of some interest.

Sincerely yours,
W. N. Drew

The figures submitted by Mr. Drew are shown below. His charts, plotted on log log ruling, are reprinted on the next two pages.


Long Series
A
L
N
Integer
100 90 80 70 60 50 40 30 25 20 15 10 9 8 7 6 5 4 3 2.5 2 1.5 1
Length in months
.1 .15 .2 .25 .3 .4 .5 .6 .7 .8 .9 1.0 1.5 2 2.5 3 4 5 6 7 8 9 10 15 20 25 30 40 50 60 70 80 90 100


Short Series
B
L
N
Integer
Length in months
30
25
20
15
10
9
8
7
6
5
4
3
2.5
2
1.5
.1
.15
.2
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.3
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.9
1
1.5
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15
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25
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40
50
60
70
80
90
100

TABLE 1—SERIES A

VARIOUS INTEGERS (N)	CALCULATED WAVE LENGTH USING FORMULA $N^2/44$	EMPERICAL LENGTH IN MONTHS, AS REPORTED IN "CYCLES"
6	.735	.733
10	2.040	2.02
11	2.470	2.51
12	2.939	2.98
13	3.450	3.40
14	4.000	4.00
15	4.591	4.78
17	5.899	6.00
18	6.610	6.86
19	7.370	7.22
20	8.165	8.17
21	9.000	9.20
22	9.881	10.00
23	10.790	10.65
24	11.75	12.00
25	12.75	12.50
26	13.78	13.50
27	14.88	14.50
28	16.00	16.00
30	18.38	18.17
31	19.60	19.45
32	20.90	21.00
33	22.24	22.15
34	23.60	23.13
38	29.46	30.0
43	37.75	37.25
50	51.00	51.5

TABLE 2—SERIES B

VARIOUS INTEGERS (N)	CALCULATED WAVE LENGTH USING FORMULA $N^2/53$	EMPERICAL LENGTH IN MONTHS, AS REPORTED IN "CYCLES"
6	.680	.667
7	.924	.913
8	1.206	1.20
9	1.528	1.47
12	2.720	2.75
14	3.700	3.79
16	4.830	4.88
18	6.120	6.07
20	7.550	7.70
21	8.320	8.50
24	10.860	11.07

It is quite amazing that almost all cycle lengths so far isolated in the stock market fall so closely along the straight lines constructed according to his formula.

Mendelejeff's Periodic Table

One is reminded of the Mendelejeff periodic table of atomic weights. Mendelejeff's work is discussed in **A Short History of Science,*** as follows:

"With gradually increasing knowledge of the fundamental constants of chemistry—the atomic weights—attempts were naturally made to connect these with the chemical and physical properties of the corresponding elements: valence, affinity, specific gravity, specific heat, etc. In 1869-51 D. I. Mendelejeff (1834-1907), a Russian chemist, succeeded in establishing a remarkable relations between these data, and on tabulating them enunciated his Periodic Law, which has resulted in the discovery of several new and hitherto unsuspected elements. As the existence of the planet Neptune (p. 390) had been predicted to fill an apparent gap in a system, so Mendelejeff under the periodic law was able to predict the existence of other and missing elements in the series of chemical elements. And just as the prediction of Adams and Deverrier was fulfilled by the Actual discovery of Neptune, so the prophecy of Mendelejeff was justified by the discovery of gallium in 1871, scandium in 1879, and germanium in 1886. Furthermore, the periodic law enabled Mendelejeff to question the correctness of certain accepted atomic weights, and here, also, he was justified by subsequent redeterminations."

It is also worthy of note that just as the Mendelejeff table of atomic weights had some blanks for elements not then discovered, the Drew formula calls for cycles which have not yet been found in the market. For example, in Series A we have no discovered cycles for N = 7, 8, 9, 16, 29, etc. Will cycle lengths to correspond to the blanks show up as the result of later work as they did in the table of atomic weights? No one yet knows, but it will be doubly intriguing if they do.

What is the significance of Mr. Drew's work? Does it mean that there is an underlying law governing cycle length and that Mr. Drew is on the track of it? Or does it mean merely that Mr. Drew is extraordinarily clever and ingenious?

Time will tell, but it is hard for me to believe that anyone could be so awfully clever unless there were some underlying reality to go on.

erd

***A Short History of Science**, by W. T. Sedgwick, H. W. Taylor, and R. P. Bigelow, copyrighted and published in 1939 by the Macmillan Company, New York. Incidentally, this is an excellent book. You may want to add it to your library.

THE SEASONAL CYCLE AND ITS RELATION TO HUMAN CHARACTERISTICS AND ABILITIES

Part I.

THE late Ellsworth Huntington, in a book* published some years before his death, set forth an important array of facts in regard to the effect of the seasonal cycle upon children born at various times of the year.

In his own words, " The season at which people are born has far greater importance than is generally supposed. At certain seasons the number of babies is unusually large, and the proportion of girls is high. The children born at those times have a low death rate in infancy, and the survivors live to more than the average age. In addition, the births of persons who achieve distinction rise to high proportions. Such conditions indicate not only that reproduction is stimulated at certain seasons, but that the children then born are more vigorous than those born at other times. There is also a little hint that mentally defective children are born in unusual numbers at this same time. Such children, however, as well as those that are malformed show a more decided tendency toward birth at the time of year when evidences of vigor are least numerous. At the most favorable season, however, criminals and persons who suffer from insanity and tuberculosis, as well as those who achieve eminence, show an unusual number of births. This, too, is an evidence that reproduction is especially stimulated at certain seasons. It apparently means that the unstable or weak types of parents from whom such people are most likely to be born respond to the influence of the seasons more completely than do more stable or stronger types.

" The season when these seemingly contradictory, but really harmonious, conditions occur among the most advanced nations is the late winter or early spring—February or March. Its place in the calender is apparently set by the fact that man is an animal. Like practically all animals he has a definite seasonal rhythm of reproduction. This rhythm appears to be an inheritance from a very ancient time, when relatively few children survived unless they were born at the best season. In our present sophisticated state children are born at all seasons, but on an average the ones born at the height of the old animal rhythm have an advantage over those born in its other phases. This book might be better if the author had been born in February instead of September."

As you can see, many fascinating vistas are opened up by Professor Huntington's research. We have space for but one of them in this report, but later reports will discuss the others. For the present article I have chosen to summarize Professor Huntington's findings in regard to the effect of the seasonal cycle upon the sex of offspring.

In general, children conceived in May, June, and July, stand a better than average chance of being girls. Children conceived in August, September, and October stand a better than average chance of being boys.

This fact, although of great scientific interest, does not have any immediate practical application that I know about, because the percentage differences are so small from one period to the other. That is, if you beget 145 children in September you would, on the average, get one more boy out of the lot than if you beget the same number of children in June. (In Japan you would have to beget only 25 children to get an extra boy.) So do not attempt to control the sex of offspring by modifying the date of conception to conform to Professor Huntington's findings, even if you live in Japan.

Some details and a chart from Professor Huntington's book follow:

"Figure 42 shows seasonal variations in the sex ratio among 11 mutually ex-

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***Season of Birth**, by Ellsworth Huntington of Yale University, published by John Wiley & Sons, Inc., New York, Copyright 1938. Excerpts and charts reprinted with permission.

clusive groups in 7 countries. Index numbers in parentheses indicate the number of births on which each curve is based and the weight which each receives in the summary curve (L). Each unit in these numbers indicates approximately 250,000 births. The final curve is based on about 52,000,000.

"The curves of Figure 42 present three outstanding features: (1) a distinct period of low sex ratios in the spring; (2) a period of high ratios in the summer; and (3) a lack of any decided character from August onward. Either February or March has a sex ratio below the average in every one of the 12 curves; in 8, if we include the summary curve, both months have a ratio below the average...

"In addition to this, the curves of Figure 42 which are based on great numbers of people, that is, those of the rural and urban United States (E and F), together with Orthodox Russia (I) and Japan (K), are the ones which most clearly display a minimum sex ratio in February and March and a high ratio in June and July. The curves based on small numbers of people display a good deal of irregularity, which suggests that other conditions as well as the seasons are important. Nevertheless, when the curves based on smaller numbers of people are averaged together, the result is essentially the same as the curves for the four larger groups of people." erd

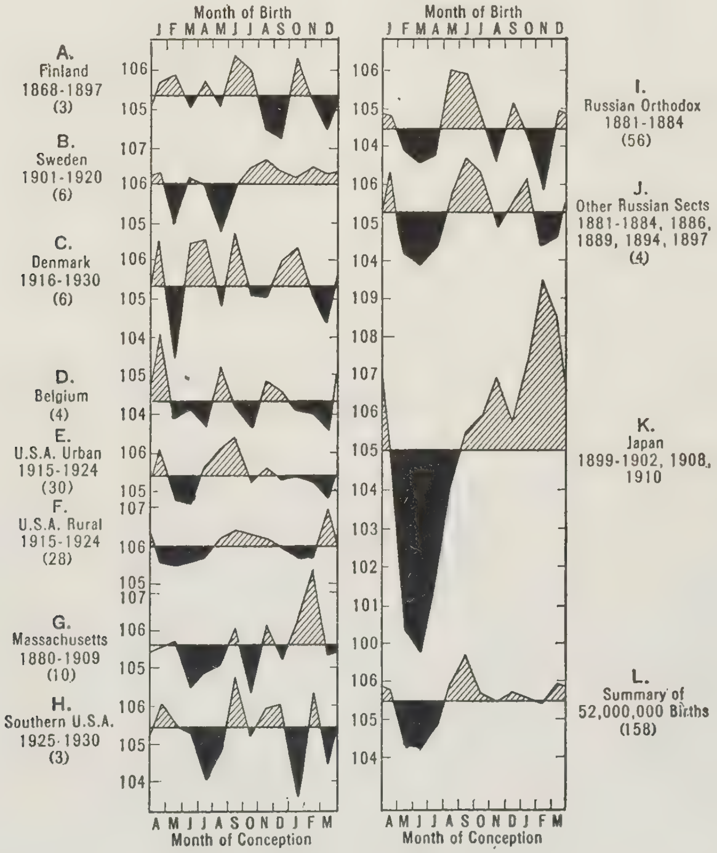


FIG. 42.—Sex Ratio at Birth.

The sex ratio is the number of males for every 100 females. A sex ratio of 100 denotes equality. All over the world boys are usually born in larger numbers than girls. Only in rare cases are girls as numerous as boys. In most civilized countries the ratio at birth is about 105, but it varies considerably in Europe.

How has it worked out?

THE 33-MONTH CYCLE

in the Sales of Company G

IF you were a member of the Foundation in February of 1951 you may remember an article which appeared in our report for that month about the 33-month cycle in the sales of a large manufacturing company known as "Company G."

This cycle in these figures appeared in the deviations from the 27-month moving average as soon as adjustment had been made for the 22.7-month cycle in these figures. (The 22.7-month cycle was discussed in the January 1951 report.)

These figures, smoothed of minor variations by a 15-month moving average, were shown in Fig. 1 on pages 50 and 51 of the February 1951 story. A zigzag was projected into the future to show what would happen if this behavior continued.

How has this forecast worked out?

To enable you to see, I have reproduced Fig. 1 exactly as it appeared in the earlier article (with one slight change to be discussed in a moment) and have added by means of a bold line the new figures which have become available since that time.

It is easy to see that the crest of the last wave did come within normal variation from perfect timing and that the crash predicted for 1951 did materialize.

Such accuracy will probably seem amazing to people who are not aware of the possibilities of forecasting by means of a knowledge of the inherent cycles.

Because the figures are smoothed by a 15-month moving average, it is impossible to continue the curve in Fig. 1 past October of 1951, but the unsmoothed figures can be shown, and are shown in Fig. 2 on the next page.

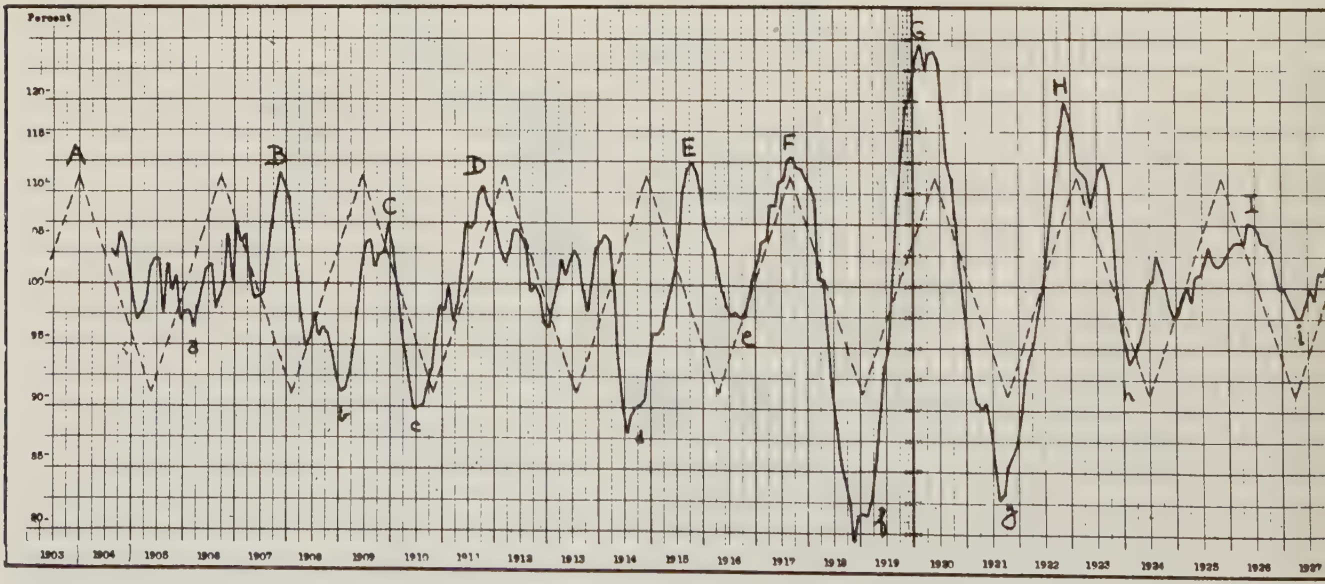


FIG. 1. THE 33-MONTH CYCLE IN THE SALES OF COMPANY G, AUGUST 1904—OCTOBER 1951.

DEVIATIONS OF THE DESEASONALIZED LOGS OF NET SALES FROM THEIR 27-MONTH MOVING AVERAGE, ADJUSTED FOR THE 22.7-MONTH CYCLE, AND SMOOTHED BY A 15-MONTH MOVING AVERAGE.

A PERFECTLY REGULAR 32.85-MONTH CYCLE HAS BEEN ADDED BY MEANS OF A BROKEN LINE. THIS CHART IS A

There is a slight error in both the smoothed and unsmoothed figures due to the fact that the present course of the 27-month moving average trend cannot be known exactly until 13 more months have passed. In the meantime these trend values have to be estimated. When the trend is known accurately (in mid 1953) the curve for the last 13 months may shift up or down a little, but the change cannot possibly be enough to change the general configuration of the curve.

The last 13 points on the curve, as shown in the original Fig. 1, were also deviations from an estimated trend. Now that the true trend can be computed, these values also change slightly, but not enough to see on the chart except for the last nine values, all of which lower a little.

Fig. 1 as reproduced herewith is based upon the true 27-month moving average trend, whereas, when printed originally, it was necessarily based upon estimates of trend for the final 13 months. This fact, and a vacation adjustment, accounts for the slight change in the curve referred to earlier.

Knowledge early in 1951 of this 33-month cycle in their sales enabled the officers of this company to anticipate this decline.

erd

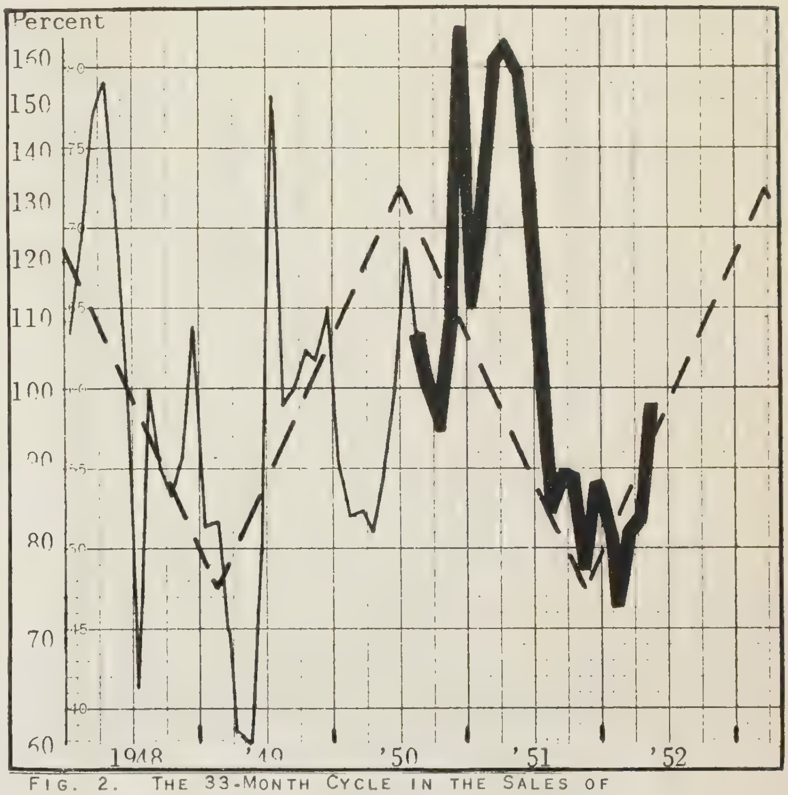
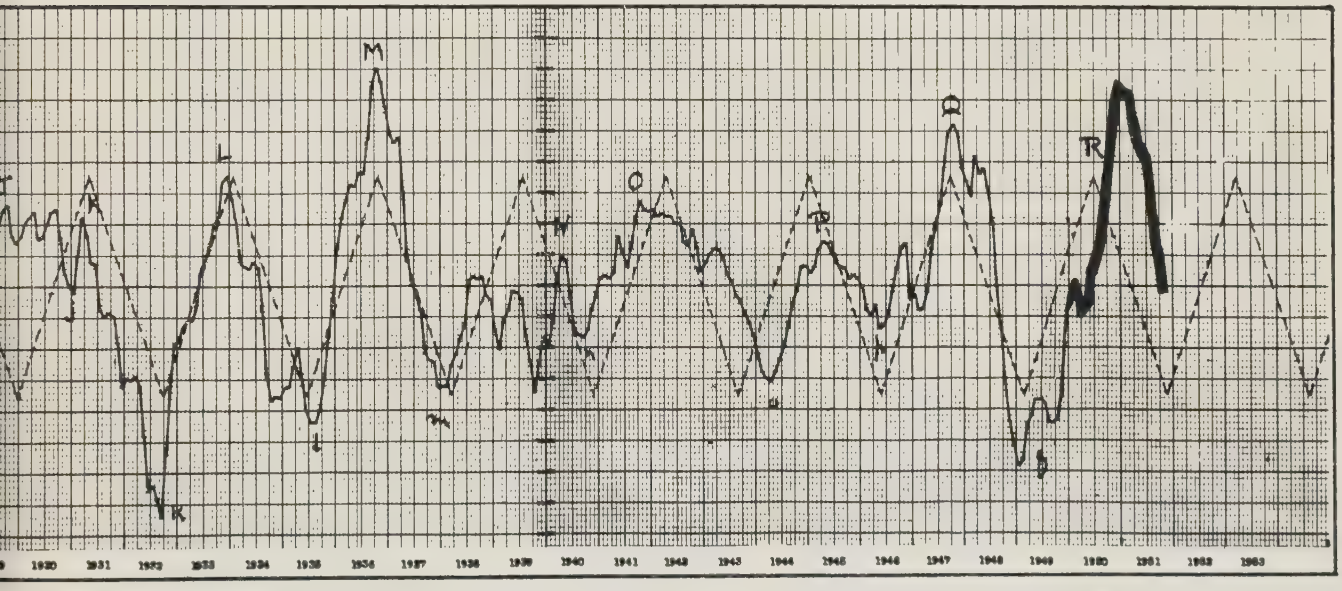


FIG. 2. THE 33-MONTH CYCLE IN THE SALES OF COMPANY G. JANUARY 1948—MAY 1952.

DEVIATIONS OF THE DESEASONALIZED LOGS OF NET SALES FROM THEIR 27-MONTH MOVING AVERAGE ADJUSTED FOR THE 22.7-MONTH CYCLE, UNSMOOTHED. THE BOLD LINE FROM AUGUST 1950 SHOWS HOW THE FORECAST CAME OUT.



REPRODOCTION OF THE CHART PUBLISHED ON PAGES 50 AND 51 OF OUR REPORT FOR FEBRUARY 1951 WITH 21 ADDITIONAL VALUES ADDED BY MEANS OF A HEAVY LINE. (THE CURVE FROM JUNE 1949 THROUGH JANUARY 1950 IS SLIGHTLY LOWER THAN THE CURVE ORIGINALLY PUBLISHED BECAUSE OF REVISED FIGURES.)

THE 9-YEAR CYCLE

of New Members in the Presbyterian Church in the U.S.A. (Northern)

THE lead article in our monthly report for June 1950 told you of a 9-year cycle in new members in the Presbyterian Church in the U.S.A. (Northern) from 1826 through 1948—the latest figures then available.

A chart of the actual figures, smoothed by a three-year moving average, and with arrows at 9-year intervals to indicate the ideal timing of the 9-year crests, was printed as Fig. 2.

That chart is reproduced herewith, together with an extension for two additional years (heavy line) made possible by data for 1949 and 1950 now available.

It is interesting to see that the forecast made two years ago has been fulfilled and that in accordance with expectation the smoothed curve increased for 1948 compared with 1947, and for 1949 compared with 1948 (the points being one year behind actual data because of the effect of the moving average).

The crest of the current cycle is due ideally in 1949. From now on the curve is due to decline. However, as examination of previous behavior shows that crests often come a year or two one way or the other from perfect timing, a lag of a year or two in the turning point would not be out of line.

It might be well to explain a little more clearly just what the points on the curve represent. The point plotted for 1947, for example, represents the average number of new members received through profession and reaffirmation of faith for the three years 1946, 1947, and 1948 (104,585). The point plotted for 1948 represents the average of similar figures for 1947, 1948, and 1949 (108,115). The point plotted for 1949 represents the average of similar figures for 1948, 1949, and 1950 (116,866). As soon as figures for 1951 become available we can get the average for 1949, 1950, and 1951 and plot a point for 1950.

Thirteen repetitions of this cycle over a period of 127 years gives support to the idea that this rhythm has significance. erd

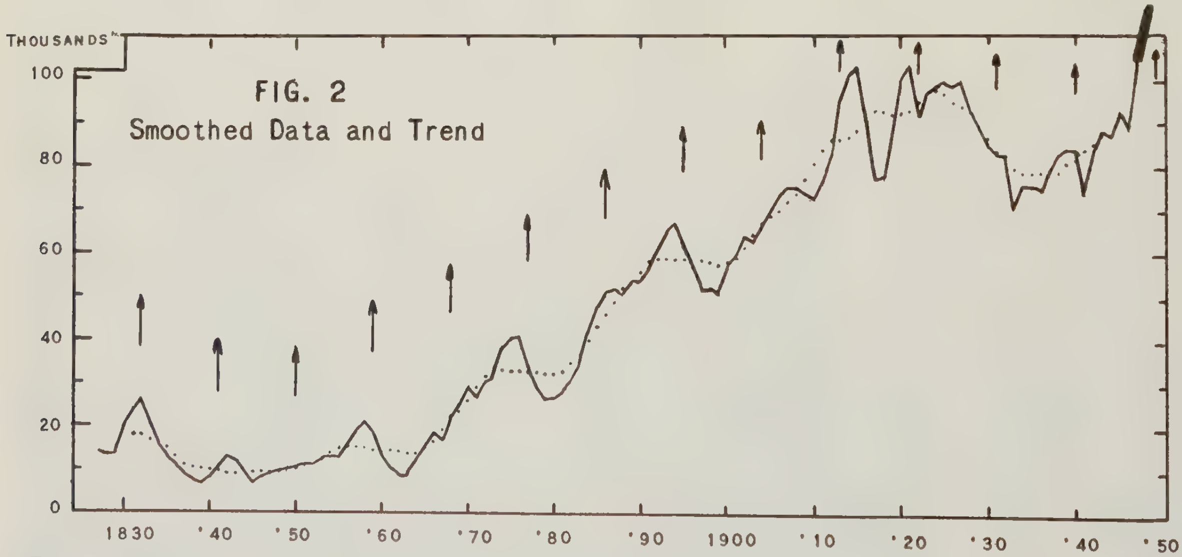


FIG. 2
Smoothed Data and Trend

THIS CHART SHOWS NEW MEMBERS OF THE PRESBYTERIAN CHURCH IN THE U.S.A. (NORTHERN) 1826—1950, SMOOTHED BY A THREE-YEAR MOVING AVERAGE. THE ARROWS SHOW IDEAL TIMING OF THE 9-YEAR CYCLE WHICH CAN BE SEEN BY INSPECTION. THE LIGHT LINE SHOWS THE VALUES ORIGINALLY PRINTED IN OUR REPORT FOR JUNE 1950; THE HEAVY LINE SHOWS THE VALUES FOR TWO ADDITIONAL YEARS. THE LAST POINT ON THE CURVE IS FOR 1949, AS THE LAST FIGURES NOW AVAILABLE ARE FOR 1950 AND THE MOVING AVERAGE LOSES ONE YEAR AT EACH END OF THE SERIES.

THE HEAVY LINE SHOWS THAT NEW MEMBERSHIP INCREASED IN ACCORDANCE WITH EXPECTATIONS, AS PRINTED TWO YEARS AGO.

Letters

LOGARITHMS CONFUSING

Dear Mr. Dewey:

Although I have been subscribing for a number of years, the mechanics of the preparation of charts, particularly logarithm, etc., is very much over my head. Someday I hope to struggle out of the absolute novice class and be able to render a little genuine appreciation of the fine work I think you are doing.

Meanwhile, I do get some ideas out of some of the charts that are presented.

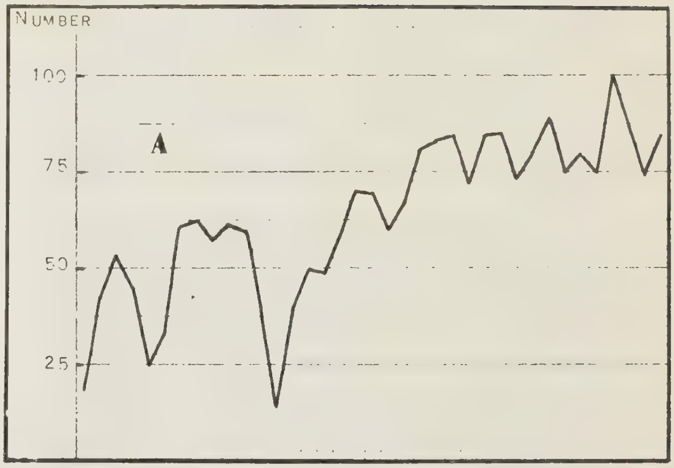
Very truly yours,

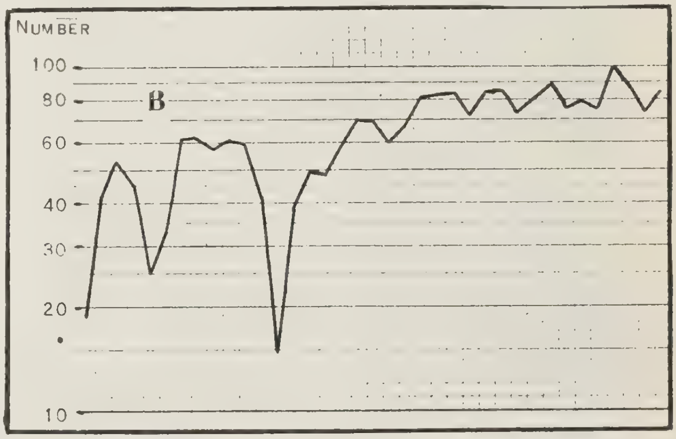
Dear Mr. -

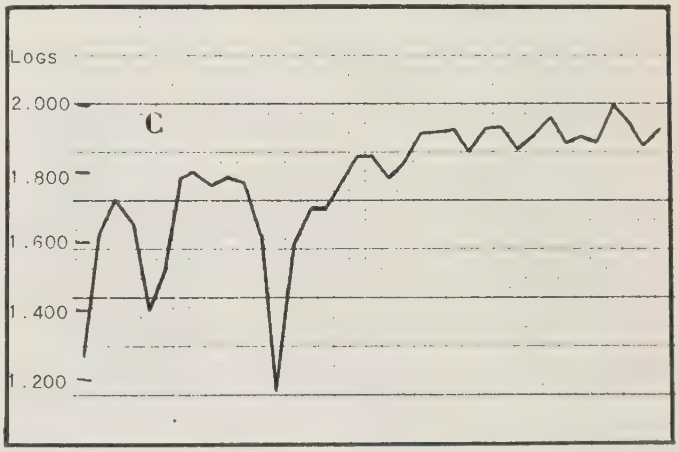
I will try to give the subject of logarithmic charts a little space in a future report. In the meantime, it may help you to remember that a chart of the logarithms of a series of numbers looks just the same as a series of numbers plotted on log paper. In either event, as far as cycles are concerned the effect is merely to pull down the peaks and deepen the troughs. For example, if you had a series of waves that ran from 75 to 133 (that is, from 25 below the axis to 33 above) and plotted this curve on log paper, the crest at 133 would show up the same distance from the axis or 100% line as the 75% troughs would be below it.

For most purposes you can forget that my charts are plotted on log paper or are logarithms plotted on arithmetic paper and read them in much the same way as you would read charts plotted on arithmetic paper.

Cordially yours,







In order to illustrate the above letter the three charts on the right are reproduced for your convenience. Curve A represents a series of figures plotted on arithmetic scale. Curve B shows the same figures plotted on ratio or semi-log scale. And in Curve C the logarithms of the same series are plotted on arithmetic scale. Note that Curves B and C are identical.

THREE SUGGESTIONS

Dear Mr. Dewey:

Accepting your invitation to express a reader's opinion in regard to the monthly reports, and finding the spaces on your questionnaire inadequate (a garrulous man would find it so) I am taking the liberty of setting forth a few ideas which have occurred to me for your consideration.

A Directory of Members Asked For

1. The possibility of compiling a directory of members, including local addresses.

It seems to me that such a directory would enable those of us among your readers who have similar fields of interest to get together for mutual study or a pooling of information which would be of mutual interest.

For example, you recently discussed with a Mr. Freeman the possibility of attempting to develop some daily rhythms in stock prices. For some time the same possibility has been of interest to me. With a view to the volume of work involved, however, and considering the daily demands of business, I have been able to do virtually nothing along these lines.

I should imagine that in this city there are probably several other members who might be interested in the same study but like myself, are unable to spare the time or, like myself are really inadequately equipped to undertake such a study. Perhaps if several of us were to pool our time and fragments of knowledge we might be able to come up with some results of value.

I should also imagine that this same procedure might be of interest to other members of the foundation who were interested in fields far removed from my own interest. I realize that such a directory would entail an expense to the foundation and I would, therefore, be quite willing to buy such a directory. Perhaps if enough others were to indicate an interest in its purchase, such a directory would be possible.

A Text of Statistical Methods Needed

2. The possibility of the publication of a text on statistical methods with special emphasis on the study of cycles.

I know that my own education hardly equipped me to undertake any original work along these lines since it consisted only of a standard university course in business statistics and such intermittent study as I have done on my own in the intervening years. Most importantly, I was not educated as a mathematician. As a consequence the whys and wherefores of some of your procedures escape me.

For example, the article, "Limitations of the Periodogram," in your June report escaped me almost entirely.

As another example, while I managed to follow the general drift of Mr. Vedder Hughey in describing his choice of methods in developing his "Predix" charts (November 1951), I should hesitate to say that I understand his methods and reasoning to the extent that I might be able to apply it to any attempted analysis of my own. This is certainly no criticism of Mr. Hughey's exposition. On the contrary, the very fact that one of my own limitations was able to follow him at all is a compliment to the lucidity of his letter of explanation.

What I am driving at is not that I should like to manage a course in advanced mathematical theory, but a text which would in some measure give us an understanding of the theory of the procedures used in the search for and isolation of rhythms to the point that in attempting research on our own we might be enabled to proceed with some semblance of logic and mathematical justification; and, further, that we might be enabled to understand the justification and logic of the procedures used in the research you publish for us.

I know that I, for one, would certainly be happy to enter an advance subscription for such a text. Perhaps if enough of the membership were to be interested, it might be of sufficient interest and profit to some member of the foundation to undertake the preparation of such a text. I feel certain that the nature of the field of study must have attracted individuals to the foundation who are, like yourself, capable of writing such a text. Further, from the "Letters" section I should be inclined to guess that there are a large number among the membership who, like myself, would certainly appreciate such a text.

Cooperative Financing of Stock Price Study Suggested

3. The possibility of special voluntary assessment of those among the membership who might be interested in the development of some special study.

It seems to me that on several occasions you have mentioned the expense involved in this type of analysis. The thought occurs to me that as a result of your current reader survey you might find that a substantial segment of the membership is interested in some particular field.

For example, I am interested in stock prices, and from the reports and advertising you use, I should be inclined to believe that you have found that a fairly large part of the membership is also interested in this field. While no one of us might feel wealthy enough as an individual to endow a particular study in which we might be interested, it might be possible that enough of us pooling a moderate amount each could come up with enough to finance such a study. I know that I am certainly open to a proposition on a study of daily stock prices. Possibly a survey of the membership might disclose enough interest to make such a precedure feasible.

Interested in Profit

As you have probably guessed, my interest in the study of cycles is not only abstract and theoretical, but is based frankly on the possibility of utilization of such information for profit. I should guess that such a factor motivates a fairly large segment of the membership. If this be true, it is quite conceivable that some of the ideas suggested above may be of interest to others.

In any event, I have rambled on at some length and taken a great deal of your time out of what is undoubtedly a busy schedule. I should only like to add that I consider your monthly reports very interesting and instructive and look forward to each issue. I think you are doing a most excellent job. I realize that you are quite busy and it is therefore not at all necessary that you take time out to acknowledge this letter.

Yours very trully,
Michael Modell

Los Angeles, Calif.

My Answer

Dear Mr. Modell:

I appreciate your letter of November 24 and the three valuable suggestions which it contains.

The Directory

1. In connection with the directory; what you really want is a list of the people in your locality who have a serious and more or less technical interest in the subject of cycles.

I think we can give this to you from the answers that come in to our advertisement in regard to the 1952 institute.

By making the announcement in regard to the institute as broad and as flexible as I have made it, and by allowing everybody, at least in the first instance, to set his own price, I think we should be able to pick up the names of almost all persons who are seriously and/or technically interested in the subject.

If this is the result of our advertising, I think that a list based on these responses would be much better for your purposes than a complete list of all members. But on the other hand, if you would like a list of all members in the Los Angeles area, let me know and I will see what we can do.

Text on Statistical Methods

2. I share with you the desire for a text on statistical methods with a special emphasis on the study of cycles. I hope someday to write such a text. In the meantime I am hopeful that the articles in the technical section of our Monthly Reports and in the Journal of Cycle Research and in the various technical bulletins that we have issued and will issue will more or less take the place of such a text.

As I use nothing but simple arithmetic in the procedures I describe, any failure on your part to understand the whys and wherefores is not due to lack of preparation on your part but lack of clarity on mine.

Many of our readers know nothing at all about statistics. If you, with your background of a college course in statistics, found my article on the Limitations of the Periodogram unintelligible, think how meaningless it must have been for some of the others! I would deeply appreciate it if you could take the time to tear the article to pieces.

I am enclosing a duplicate article herewith. Mark the words you do not know the meaning of. Mark the sentences you do not understand. Mark the places you would like to have expanded or actually spelled out with an example, the arithmetic of which is worked out.

I know exactly how you feel because I often get technical material written by others that is completely incomprehensible to me. As one man wrote at the end of a long exposition, "The idea is simple but, as the man says, it don't explain so good."

Cooperative Financing a Grand Idea

3. As I have indicated a number of times in the Monthly Report I do not believe that in the present state of our knowledge of cycles we are able to make forecasts of market behavior which, by themselves, are adequate for profitable operation. I feel that the way to profit would be the isolation of a short-term cycle which has repeated itself so often that it cannot easily be attributed to chance, and has repeated itself with enough regularity so that it can be played on an actuarial basis. (Two or three cycles would be even better than one.)

In industrial common stock prices we have monthly figures from 1871—972 months of data. During this period a three-month wave, if there should be such a wave, will have repeated itself 324 times. Repetitions in this order of magnitude surely cannot be attributed to chance. If, over a span of years, such a wave has repeated with reasonable consistency and if playing such a wave would show, let us say, three small profits for every one or two small losses, I should think that one would be justified in acting on such information in expectation, or at least hope, of three small gains and two small losses for the future.

Glad to Make Studies

I would be glad to make studies of this sort for any group of members who might wish to pay the cost.

I plan to publish your letter and my reply in a forthcoming Monthly Report although, of course, I will omit your name if you wish me to do so. Perhaps the publication of these letters will bring forth (a) the names of people in your community who would like to study cycles cooperatively, (b) suggestions in regard to a text of cycle research techniques, and (c) the names of people who, like yourself, might like to chip in to research in regard to one particular short-term cycle in the weekly or daily figures of some particular stock.

Very cordially yours,

MOVING AVERAGES ALWAYS CENTERED

Dear Mr. Dewey:

About charts showing moving averages: Please state for each therewith if the average is plotted on middle date or for last date on which data shows. No moving average is worth anything to students of price changes if it is not plotted on the same date as last data plotting. Charts which do not make this clear cannot be used from this angle by "chart readers."

Very truly yours,

Gentlemen:

In all cases we center moving averages. This is in accordance with standard statistical practice and is essential for further manipulation of the figures.

I make this statement advisedly in full knowledge that certain chart readers plot moving averages on the date of the last figures included. This is unsound statistical practice.

Cordially yours,

Questions and Answers

Q. What is a moving difference?

A. A moving difference is a series of figures derived from the figures with which you are working by subtracting from each term successively some other term, a fixed number of terms previous. The interval between terms to be subtracted is indicated by a prefix thus: a " 12-month moving difference," a "14-month moving difference," a "6-year moving difference," etc.

For example, if you wished to compute a 12-month moving difference of a series of monthly figures starting in January 1902, you would proceed as follows: From the value of January 1903 subtract the value of January 1902. This gives you the first or January 1903 term of your moving difference. Then, from the value of February 1903 subtract the value for February 1902 to get the second or February 1903 value of your moving difference.

The moving difference (and its first cousin, the moving percentage or moving ratio, obtained by division instead of subtraction) is of great use in cycle analysis as any given length of the moving difference has different effects upon each cycle present in the original series.

For example, a 12-month moving difference will eliminate any regularly recurring 12-month cycle and all cycles which are harmonics or unit fractions of that length, such as 6-month, 4-month, 3-month and 2-month cycles. At the same time it will magnify any regularly recurring and symmetrical 8- or 9-month cycles and any such 5-month or 3½-month cycles. If you had a series of figures containing simultaneously a mixture of regularly recurring 9-month and 12-month cycles you could easily separate the two cycles by computing first a 12-month moving difference (or moving ratio) which would eliminate the 12-month or seasonal pattern and magnify any symmetrical 9-month waves. You could then compute an 18-month moving difference (or moving ratio) which would eliminate the 9-month cycle and would magnify any symmetrical 12-month or seasonal pattern.

An 18-month moving difference removes any regularly recurring 9-month cycle because 9 is a harmonic or unit fraction of 18 (one-half).

If you wanted to eliminate both 9- and 12-month cycles simultaneously you could compute a 36-month moving difference (or moving ratio) because 12 is 1/3 and 9 is 1/4 of 36 and both cycles would vanish, as well as any cycles in the neighborhood of three years. A 36-month moving difference would magnify two-year and six-year cycles.

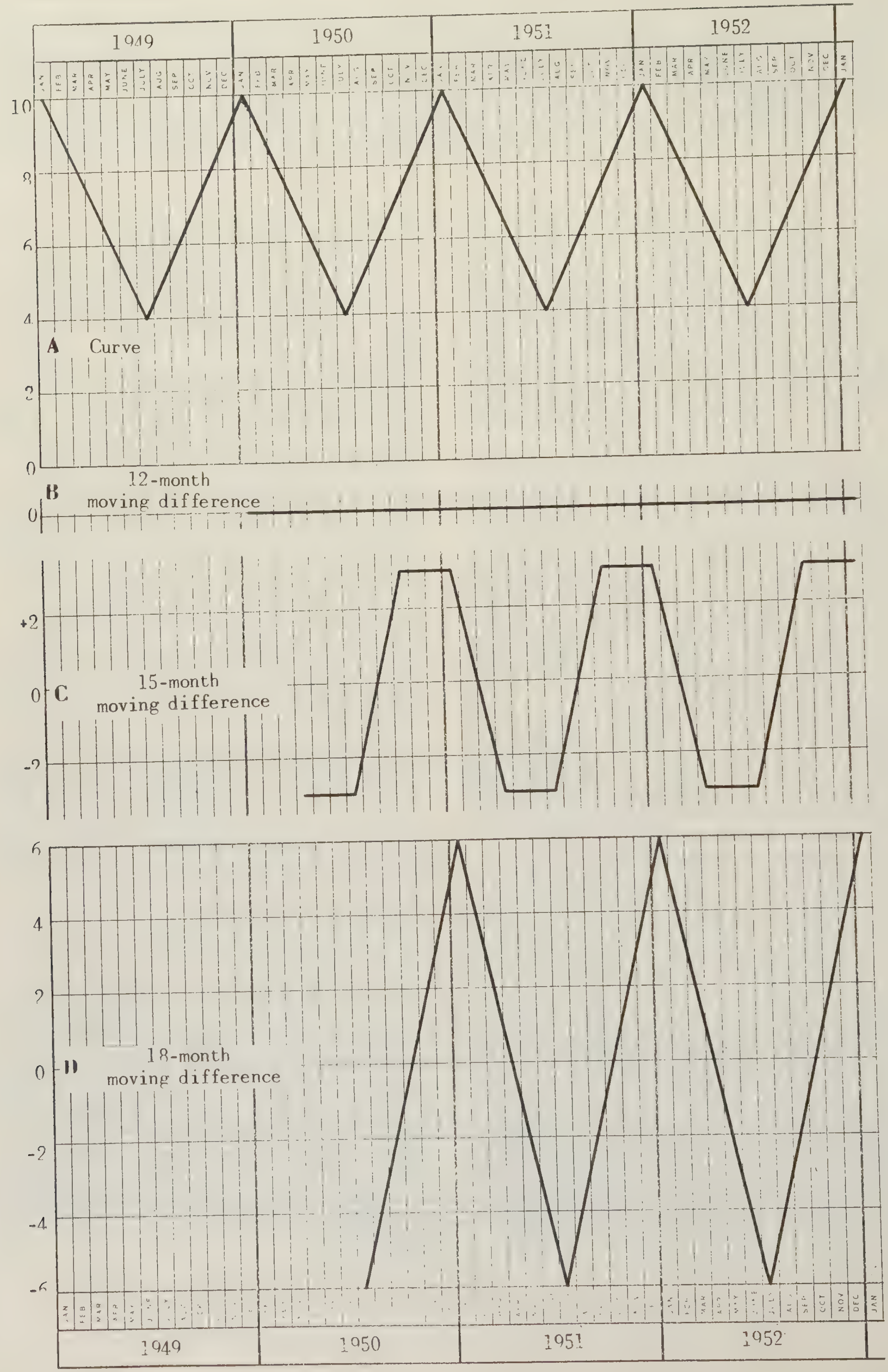
The matter may be clearer if I draw you the diagram shown on the next page.

If we compute the 12-month moving difference of the curve plotted as A, the first term of our moving difference will be zero (10, the value for January 1950, minus 10, the value for January 1949). We plot this value at January 1950 in Curve B.

The second term of the moving difference is also 0 (9, the value for February 1950, minus 9, the value for February 1949). So is the third term. And all the other terms. The 12-month cycle shown in Curve A is completely eliminated.

Let us now compute the 15-month moving difference of the values in Curve A. The first term of such a computation would be 7 minus 10 or minus 3, plotted at April of 1950. The second term, plotted at May 1950 would be 6 minus 9, or minus 3. These two values, and the other values of a 15-month moving difference, are plotted in Curve C. You will note that the amplitude and length of the cycle remains as it was to start with, but that the shape changes and so does the phase (timing).

Now we compute an 18-month moving difference and plot the result in Curve D. The phase, shape, and wave length remains as it was in Curve A, but the amplitude doubles.


1949
1950
1951
1952
JAN FEB MAR APR MAY JUNE JULY AUG SEP OCT NOV DEC
10
8
6
4
2
0
A Curve
B 12-month moving difference
0
+2
0
-2
C 15-month moving difference
6
4
2
0
-2
-4
-6
D 18-month moving difference
1949
1950
1951
1952

Additions to the Library

"English Aurorae of A.D. 1600/61," by D. Justin Schove, and discussion, reprinted from the **Journal of the British Astronomical Association**, Vol. 62, No. 1, pp. 35-41, and Vol. 62, No. 2, pp. 62-65, January, 1952. Gift of the author.

In this interesting paper Mr. Schove continues his painstaking investigation of historical and other references to aurora.

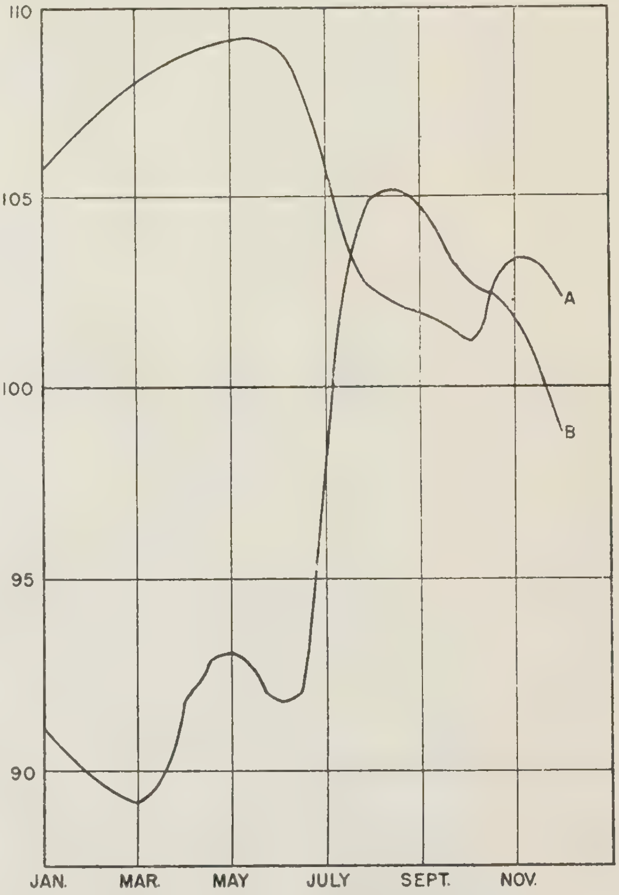
From the existence of aurora, by inference, there can be deduced the existence of sunspots. Eventually, with the help of workers such as Mr. Schove we should have a reasonably reliable record of probable dates of sunspot maxima for hundreds and hundreds of years before actual telescopic observations were recorded. Such facts are of value to the student of cycles, especially if there proves to be any connection between sunspot cycles and terrestrial affairs.

• • •

Important Interferences With Normals in Weather Records, Associated With Sunspot Frequency, by C. G. Abbot, Smithsonian Miscellaneous Collections, Volume 117, Number 11, (Publication 4090), Smithsonian Institution, May 20, 1952. Gift of the author.

In this paper Dr. Abbot discusses the effects of sunspots on the precipitation at Peoria, Illinois: ".... the average percentage precipitation was about 9% higher when Wolf sunspot numbers exceeded 20 than when the Wolf numbers were below 20 ..." and "... the average computed percentages showed large 12-month periodicities. The amplitude of these periodicities is about 8% when Wolf sunspot numbers exceed 20 and about 16% when the Wolf numbers are below 20."

Dr. Abbot, as you doubtless know, is Research Associate of the Smithsonian Institution and was for many years its Secretary and guiding head. He is a member of the Committee of the Foundation for the Study of Cycles



The above chart shows two curves for the 12-month or seasonal precipitation pattern at Peoria, Illinois. Curve A, with high precipitation during the first half of the year and low precipitation during the second half of the year, represents the average behavior (1858—1939) when the Wolf sunspot numbers were above 20. Curve B, with low precipitation in the first part of the year and high precipitation in the second part of the year, shows the average behavior during the same period when the Wolf sunspot numbers were less than 20.

Glacier Fluctuation in Northwestern North America Within the Past Six Centuries, by Donald B. Lawrence, Union Geodesique et Geophysique Internationale, Association Internationale d'Hydrologie Scientifique, Assemblee Generale de Bruxelles 1951, Extrait du Tome I, Gift of the author.

Dr. Lawrence is Associate Professor of Botany, University of Minnesota. Outside of botany his chief interests are ecology of recently glaciated volcanic areas, climatology, causes of glacial advances and recessions, and methods for field biologists.

In his résumé of this paper Dr. Lawrence says "With the aid of stereoscopic vertical aerial photographs, ground studies of the areas adjacent to the termini of living glaciers in the vicinity of Juneau, Alaska, where features are best developed, reveal a series of closely spaced recessional moraines which appear to have been formed at intervals of about 11 years during the first century and a half following the 18th century maximum. The paper discusses the apparent correlation between the formation of these recessional moraines, and troughs of the sunspot cycle, correlation between the early 18th century maximum and the close of the 70-year period of sunspot dearth, 1645-1715, and the mechanics by which variations in solar activity might induce glacier variation."

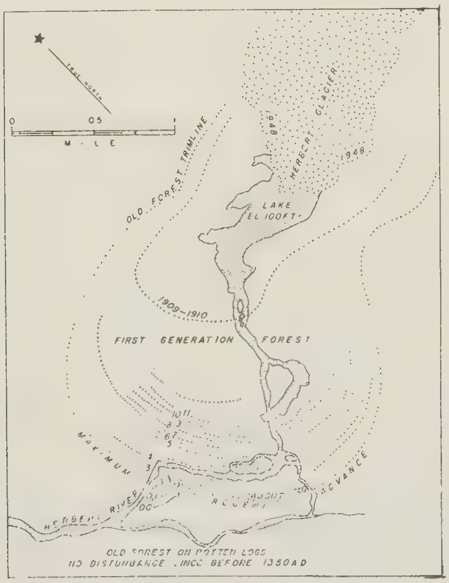


FIG. 1. — Sketch map of the terminal area of the Herbert Glacier, Alaska, traced from U. S. Navy photo SEA 35R-33 taken in the summer of 1948. The numbered dotted lines are the terminal and recessional moraines formed since 1740 A. D.; the numbers refer to the moraine numbers of Figure 2. The location of the 1909-1910 position of the ice front is taken from « Geologic map of Eagle River Region, Alaska », U. S. Geological Survey Bull. 502, 1912, Pl. 2, 1 : 62, 500.

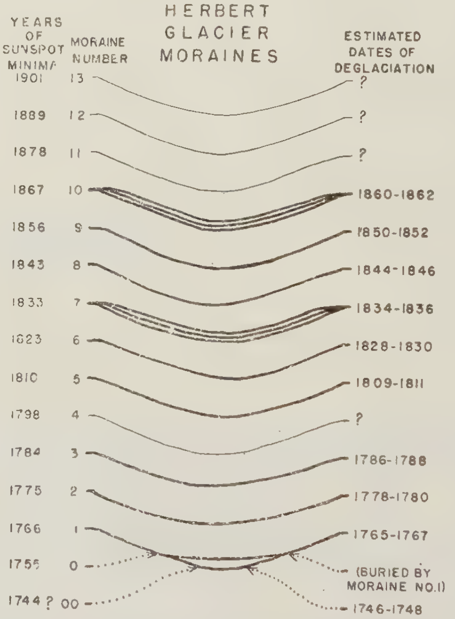


FIG. 2. — Interpretation of periodicity in the formation of moraines of Herbert Glacier assuming a moraine to be formed at each sunspot minimum of the «11-year cycle» during the first 160 years of recession. Heavy lines are sampled moraines, light lines are visible but unsampled moraines. Each of the estimated dates of deglaciation (right) is based on the age of the oldest tree sampled on that moraine. The moraine numbers correspond with the numbers on Figure 1. The triple crests of moraines 7 and 10 are assumed to have been produced in the winters of three successive years.

• • •

Season of Birth, by Ellsworth Huntington, Yale University, John Wiley & Sons, Inc., New York, 1938, 473 pages, 104 figures, 26 tables, appendix, and index.

The season of birth seems to have many consequences. A series of articles on this subject, based on this book, starts in this issue.

PERIODIC INSPIRATION
in
POETRY AND MUSIC

By

J. H. Douglas Webster

Reprinted from
THE POETRY REVIEW
Volume XXXIV, Number 3

Foundation Reprint No. 9

First Issued in 1945
Re-Issued in 1950

FOUNDATION FOR THE STUDY OF CYCLES

FOREWORD

DR. J. H. DOUGLAS WEBSTER'S *chief contributions to the knowledge of rhythmic fluctuation are in the field of medicine. It is, however, a condensation of his address before The Poetry Society* (*London*) *dealing with rhythms of inspiration in poetry and music that has seemed to us to be of more general popular interest at the present time and therefore more suitable for publication as a Foundation Reprint. This condensation is reproduced herewith through the kindness of Dr. Webster and of* The Poetry Review.

Are there really rhythms of creative ability? If so, are we all subject to them? Are there time intervals other then the 33 weeks observed by Dr. Webster? Is this rhythm really associated with similar rhythms in sun spot numbers? If so, is there a cause and effect relationship? If there is what could be its mechanism?

These are some of the questions that come to mind as one reads the fascinating little paper that follows.

EDWARD R. DEWEY

PERIODIC INSPIRATION IN POETRY AND MUSIC

. . she saw
Time like a pulse shake fierce
Through all the worlds.

AS our bodies in their functions (as breathing) show rhythms, and in their growth and development show stages or periods (as Shakespeare's *Ages of Man*), so it is likely that the mind has its cycles, other than those of sleep and waking, or those caused by the seasons of the year.

In a few poets and musicians, and in several other writers and scientists, it has been found that the "peaks" of their productiveness show a cycle or rhythm, based on a cycle which in recent years has been found to be operative in a number of widespread diseases (as tuberculosis, cancer, influenza, malaria, and a number of other infective, metabolic, nervous or mental diseases). Such a widespread range suggests some earth-wide natural cause; and it is suggested that the physical cause of this cycle is the minor cycle in sun-spot activity first discovered by R. Wolf of Zurich in 1859. [The 11-yearly sun-spot cycle (with its minor 4- and 7-year waves) has been known for some time to affect plant life, as in the breadth of annual tree-rings; and animal life, in epidemics and in other ways; and the 7.6 months (33 weeks ±3 weeks) cycle of Wolf has been shown to affect growth in the California Redwood trees.]

Cabanis (1802), Goethe (1828), Dowden (1875) and Alice Meynell (1893) are among those who have suggested that thought, specially in artistic creation, is subject to rhythm. But apart from the monthly (27-28-day) cycle—an eighth of the period, and the 7-yearly cycle—eleven periods, no attempts have been traced which have led to the recognition of any definite rhythmic "laws of thought." [The monthly cycle has been studied in a much too rigid way by Fliess (1906, 1923); and the 7-year cycle has been studied by Swoboda (1917), from a heredity aspect in human records and in race-horses.]

Wolf's 7.6 months' period, found to be operative in some cases of mental cyclic disorder, has been found to be the basis of the peaks of creative activity in the following:

(1) Rupert Brooke, Keats, Shelley, Gray, Victor Hugo; Mozart, Rimsky-Korsakov, Tschaikovsky, Sibelius (in all these *monthly* data are available).

(2) Christina Rossetti, Anne Bronté, Goethe (often), Platen, Schutze; Schubert (often) (in these *daily* data are usually available).

In many artists the data needed (at least *monthly*) have not been recorded in the Biographies or Collected Works consulted: thus, in the instances of Coleridge, Wordsworth and Whittier, only *yearly* data are given as a rule.

Several of the above-mentioned artists suffered from tuberculosis, which has a similar cycle of relapses; but in others there was nothing to indicate that disease played any part in the cycles of their productiveness.

The periods of creative activity can be appreciated best if the dates of the artist's works are charted out graphically on scaled paper. Such charts have been prepared for Rupert Brooke, Keats and Shelley (monthly data); and for Christina Rossetti (daily data); also for the "onsets" of ten artists (*i.e.*, first signs of creativeness above the ordinary level).

Studies can hardly be carried out in detail, or in many instances, without a Table of Dates at 7.6 months' intervals (as one published by me). But when greatly abbreviated the periods may be recognised if the main "peaks" are tabulated as follows:

KEATS

Periods (7.6 m.)	*Dates*	*Works (peaks)*
	1816, October	*Chapman's Homer* sonnet (first poem showing genius).
1	1817, May	*Endymion* begun;
1	1818, January	*Endymion* finished; "When I have fears" sonnet.
1	1818, September	*Hyperion* begun;
1	1819, April-May	*Hyperion* ended; Odes:
½	1819, September	*Autumn* ode; (Letters).
1	1820, April	*La belle Dame* revised.
½	1820, September 2	*Bright Star* revised.

A full analysis of the dates of the works of Keats would occupy much more space than can be given here. But it may be noted that his other better poems were mostly composed on the five half-periods from November, 1815, to May, 1817, and on the five half-periods (very slightly longer) from January, 1818, to September, 1819: in the intermediate months as a rule only minor compositions were produced. *Endymion* and *Hyperion* (first draft) were composed on "plateaux," each lasting about 7.6 months. (These "terraces" or "plateaux" are characteristic in some diseases.) Shelley, in some of his longer poems, shows similar "plateaux" of creativeness.

Much interest relates to the detailed chart prepared from the *daily* data available for the poems of Christina Rossetti: the years 1856-1860 were chosen, as her brother, William Michael, said in his Memoir, these were among the "least unhealthy years" of her womanhood. As she wrote in all about 1,050 poems, very many dated to the day, and most of them were quite short, the data are of great value. Eight "half-periods" in polyphases are shown from January 20th to December 31st, 1856; and three periods (in polyphase) (January 20th to September 11th; March 12th to October 28th; and April 14th to November 28th).

33 dates of poems in the years 1856-1860 are interconnected by periods or half-periods, or by their multiples or sub-multiples. Half periods are seen both in the 15 weeks' and 18 weeks' varieties, as in the 16½ weeks' type. Many dates are accurate *to the day* on the 7.6 months basis.

In Christina Rossetti can be traced well two corollaries of the theory here suggested. One is that, as indicated above in the notes on Keats, minor compositions are usually written on dates intermediate between the main periods. I can confirm this aspect from my MS. copies of my own rejected poems (pen-name : Colin Tolly) ; almost always the better compositions have been written at "periods" ; and whenever an "urge" to compose has been at an interval, or at a very minor "period" (as a 27-28-day one, which does not coincide with a 7.6 one, or its half or quarter), then the result as a rule has been mediocre. The second corollary is that certain ideas or moods are periodic. Thus, Christina Rossetti has several poems describing nightmares : these are all periodic. A similar relationship has been traced in the case of Goethe, as regards his inspiration from Greek subjects ; and in the case of Platen in several of his topics for poems.

Seven- and 11-year periods have been traced in Gray, Southey and Goethe, among others. They can only be referred to briefly here. The 7-year period was first noted by Pythagoras, and was known to Cicero and Seneca.

The ancient and some modern theories of "inspiration" would require much space for anything like an adequate discussion. In the encyclopaedias the subject is dealt with usually under the main or sole topic of religious inspiration. Meric Casaubon, in 1656, published the second edition of one of the best studies I have found of "enthusiasm" (apart from religious aspects) : he discussed it under general headings and five special types, as rhetorical, poetical and philosophical (he hoped to have included musical and military among other types which remained undescribed). In these spheres he held it was "natural," and neither divine nor diabolical. Writing in the days when witchcraft and astrology had many believers his work is full of a wisdom much in advance of his time. Goethe, in his *Conversations with Eckermann* (1828), had much of value to say about inspiration or "productiveness" : remarkable discoveries and thoughts are not in the power of anyone ; they are "elevated above all earthly control. Man must consider them as an unexpected gift from above, as pure children of God, which he must receive and venerate with joyful thanks." A. J. (Lord) Balfour (1895) said of inspiration that it is "limited to no age, to no country, to no people . . . . every addition to knowledge, whether in the individual or in the community, whether scientific, ethical or theological, is due to a co-operation between the human soul which assimilates and the Divine power which inspires."

From the psychological point of view inspiration can arise on various levels of importance; and on the side of the emotions, the thoughts or the will, or in various combinations. Music usually springs up as a *mood* first of all; and many poems and other works of art have begun in this way. How it comes in the realm of *ideas* has been explained perhaps best by William James (1892), as the unsought meeting of two ideas by free association causing an "explosion." Middleton Murry, in his illuminating study of Keats's *Chapman's Homer* sonnet (1928-1929), showed how the reading of Homer in translation throughout one night, with his friend Clarke, was as a "spark to ignite a highly combustible gas in the poet's mind into a flash of perfect incandescence. The force of the explosion is as great as the flame is beautiful." Dr. Rosamond Harding, in her valuable study, *An Anatomy of Inspiration* (1940), advocates a similar "flash" theory.

The subject here brought forward has many theoretical and practical aspects of importance. How many examination candidates have failed unexpectedly because the date chosen happened to be one when their memory and powers of expression were not at their best? Horace, in the *Art of Poetry* said, "You should speak or do nothing if Minerva is unwilling" (*Tu nihil invita disces faciesve Minerva*). And Goethe advised that one should "force nothing, and rather trifle and sleep away all unproductive days and hours." The misery many artists have endured in times of fallowness or depression would have been lessened had they recognised the inevitableness of rhythm in creation: men—"if they would be wise, must wake and rest in its phases" (Alice Meynell). Further research certainly is called for in this promising field.

J. H. DOUGLAS WEBSTER.

Postscript.—Similar cycles of productiveness have been found (on a 7.6 months' basis) in: Walter Scott, Kathleen Mansfield, Flaubert, Ibsen; Wagner; Charles Darwin, Claude Bernard and Faraday. 7- or 11-year periods can be traced in the lives and writings of A. E. Housman and W. B. Yeats.

J.H.D.W.

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